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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/006,999	12/03/2001	Vance Faber	LIZA118255	1092

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EXAMINER	
HUNG, YUBIN	
ART UNIT	**PAPER NUMBER**
2625	

DATE MAILED: 01/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/006,999	FABER ET AL.	
	Examiner	Art Unit	
	Yubin Hung	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10/21/05 & 12/05/05*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-10,12-18,39 and 40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *12-18 and 39* is/are allowed.

6)☒ Claim(s) *1-5,7-10 and 40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *11/15/04*.

4)☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application (PTO-152)

6)☐ Other: _____.

Response to Amendment/Arguments

1. This action is in response to amendment filed 10/21/200 and supplemental amendment filed 12/05/2005, which have been entered.

2. Claims 6, 11 and 19-38 have been cancelled; claims 39 and 40 have been added. Claims 1-5, 7-10, 12-18, 39 and 40 are still pending.

3. In view of Applicant's amendment, the objection to the specification has been withdrawn.

4. In view of Applicant's amendment, the 35 USC § 112 rejections have been withdrawn.

5. Applicant's amendment has rendered the rejections of claims 1-5, 7-10 and 12-18 moot. However, new ground(s) of rejection have been found. See below.

DETAILED ACTION

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 7-10 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Gormish et al. ("Lossless and nearly lossless compression for high quality images," *Proc. SPIE*, Vol. 3025, March 1995, pp. 62-70).

8. Regarding claim 1, Gormish discloses

- transforming a plurality of input data values using a computer, the first plurality of output data values approximating a second plurality of output data values, the second plurality of output data values generated by applying a linear transform to the plurality of input data values, the method comprising at least one step, the step being one of the following:
  - rearranging at least one data value in a plurality of current input data values
  - negating at least one data value in the plurality of current input data values
  - modifying at least one data value in the plurality of current input data values, each modified data value generated by applying a linear combination of unmodified values in the plurality of input data values to the at least one data value, the linear combination comprised of an integer generated in a reproducible manner, the integer being from one of a group consisting of a rounded integer and a converted integer
  - a step which is equivalent to a successive combination of one or more steps of the preceding three types
  - wherein the linear transform is a fixed finite-dimensional linear transform
  - the linear transform is one of a plurality of color transform

[P. 63, Eq. 1; P. 64, Eqs. 2-4. Note that (R,G,B) represents input data values: (Y_r,U_r,V_r) represents the 1st plurality of output data values; and (Y,U_r,V_r), where Y = (R+2G+B)/4, represents the 2nd plurality of output data values. The linear transform is defined by Y = (R+2G+B)/4, U_r = R-G and V_r = B-G, i.e., the 3x3 matrix of [(1/4,2/4,1/4),(1,-1,0),(0,-1,1)], where each triplet represents a row. Note further that the computations of U_r and V_r involve negating at least one data value (G in both cases) and the computation of Y_r involves linear combination and generating an integer in a reproducible manner by using a floor function (i.e., to generate a "converted" integer. Clearly the linear transformation defined above is finite-dimensional color transform]

9. Regarding claims 2 and 3, Gormish further discloses

- **(claim 2)** the first plurality of output data values are integers if the plurality of input data values are integers
- **(claim 3)** the plurality of output data values can be reconstructed exactly from the first plurality of output data values

[Per the analysis of claim 1]

10. Regarding claim 7, note that any invertible 2-dimensional diagonal matrix whose k-th (where k is the index of the only non-zero element of the input data values) diagonal element has a value of one (such as the identity matrix) satisfies the limitations.

11. Regarding claim 8, note that a nxn matrix (i.e., a linear transform) of a dimension suitable for the size of the input data, consisting of integral elements (e.g., the matrix [(2,0,0),(0,1,0),(0,0,1)], which is a kind of color transform when applied to color input values such as R, G and B by amplifying green), satisfies all its limitations:

- the plurality of input data values includes an input integer plurality and the second plurality of output data values includes an output integer plurality

- the linear transform mapping an integer multiple of the input integer plurality to an integer multiple of the integer output plurality, the integer multiple of the input integer plurality corresponding to the integer multiple of the integer output plurality
- the method mapping the integer multiple of the integer input plurality to the corresponding integer multiple of the integer output plurality [Note that the method in this case obviously is the application of the linear transform using a computer; each rows effects the replacement by a linear combination of input values]

12. Regarding claim 9, Gormish further discloses an RGB-to-YC_bC_r color transform [P. 64, Eq. 5].

13. Regarding claim 10, Official notice is taken that RGB-to-YIQ color transform is well known at the time of the invention and it would have been obvious for one of ordinary skill in the art to use this transform instead if it suites the intended applications.

14. Regarding claim 40, Gormish discloses

- transforming a plurality of input data values using a computer, the first plurality of output data values approximating a second plurality of output data values, the second plurality of output data values generated by applying a linear transform to the plurality of input data values, the method comprising *at least one step that is equivalent to a successive combination of one or more steps of the following steps*:
  - rearranging at least one data value in a plurality of current input data values
  - negating at least one data value in the plurality of current input data values
  - modifying at least one data value in the plurality of current input data values, each modified data value generated by applying a linear combination of unmodified values in the plurality of input data values to the at least one data value, the linear combination comprised of an integer generated in a reproducible manner, the integer being from one of a group consisting of a rounded integer and a converted integer

[P. 63, Eq. 1; P. 64, Eqs. 2-4. Note that (R,G,B) represents input data values: (Y_r,U_r,V_r) represents the 1st plurality of output data values; and (Y,U_r,V_r), where Y = (R+2G+B)/4, represents the 2nd plurality of output data values. The linear transform is defined by Y =

(R+2G+B)/4, U_r = R-G and V_r = B-G. Note further that the computations of U_r and V_r involve negating at least one data value (G in both cases) and the computation of Y_r involves linear combination and generating an integer in a reproducible manner by using a floor function (i.e., to generate a "converted" integer. Therefore, Eq. 1 involves one or more of the three steps of the claim]

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

16. Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gormish et al. ("Lossless and nearly lossless compression for high quality images," *Proc. SPIE*, Vol. 3025, March 1995, pp. 62-70) as applied to claims 1-3, 7-10 and 40 and further in view of Daubechies et al. ("Factoring Wavelet Transforms into Lifting Steps," *J. Fourier Analysis Applications*, Vol. 4, No. 3, 1998, pp. 247-269).

17. Regarding claim 4, Gormish discloses all limitations of its parent, claim 1. In addition, the linear (color) transform disclosed in Gormish (i.e., the matrix of <(1/4,2/4,1/4),(1,-1,0),(0,-1,1)>, where each triplet represents a row; see the analysis of claim 1) has a determinant that is an integer ("-1" to be precise) and is therefore a degenerative form of a Laurent polynomial

Nonetheless, Daubechies discloses the use of a more general linear transform that

- has a determinant, the determinant being invertible as one of a group consisting of an integer and an integer Laurent polynomial [P. 8, last paragraph]

Gormish and Daubechies are combinable because they both have aspects that are form the same field of endeavor of transforms.

At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify Gormish with the teaching of Daubechies by using a linear transform that has a determinant with the recited characteristics. The motivation would have been to have the perfect reconstruction property (see P. 8, Eq. 2 and the two lines above it).

Therefore it would have been obvious to combine Daubechies with Gormish to obtain the invention as specified in claim 4.

18. Regarding claim 5, Daubechies further discloses

- rescaling at least one of a plurality of bands in the linear transform [P. 8, last four lines]

Allowable Subject Matter

19. Claims 12-18 and 39 are allowed. **[Note: Claim 39 recites "combination of unmodified values" in lines 17, 23 and 26, each corresponding to one of three passes of data processing (recited in lines 16-19, 20-25 and 26-28, respectively). It is clear that "unmodified" in each pass is with respect to the processed data from its preceding pass and is so interpreted for examination purpose.]**

20. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 39, closest art of record Gormish discloses the limitations recited in the first three paragraphs of the claim (per the analysis of claim 1). Additionally, Li et al. ("On implementing Transforms from integers to integers," Proc. ICIP, Vol. III, 4-7 Oct. 1998, pp. 881-885) discloses reversible integer-to-integer transform (for a given linear transform). However, neither teaches nor suggests modifying at least one data value using the three passes as recited in the claim.

Conclusion and Contact Information

21. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

22. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yubin Hung whose telephone number is (571) 272-7451. The examiner can normally be reached on 7:30 - 4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (571) 272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Patent Examiner
January 9, 2006

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